

S P E C I F I C A T I O N

ADAPTABLE REMOTE CONTROL WITH EXCHANGEABLE CONTROLS

BACKGROUND OF THE INVENTION

5 Field of the Invention

The invention relates to remote controls and more particularly to remote controls that can be personalized and which are capable of sharing information with other remote controls.

10 Background

Programmable, and thereby customizable, remote controls are known. For example, a product made by Philips Electronics Corp. called Pronto® allows a user to program her/his own controls into a hand-held remote. For example, the controller could be programmed to have a "favorites" button that only switches between selected favorite channels. An example of such a device is described in US Patent No. 5,327,160, filed Nov. 16, 1992. Also known are customizable broadcast control devices which allow a user's preferences for broadcast content to be stored and used to filter selections. Another unrelated area of technology is personal digital assistants (PDAs). A PDA is

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## SUMMARY OF THE INVENTION

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may be used to control a television, video, or Internet broadcast device. For example, a first bead may correspond to genre, a second bead to time of day, a third to a preference profile of a person other than the user, and a fourth to a preference profile of the user. The string also includes a console to allow the user to communicate preferences with respect to the beads to a set-top box that controls a television and electronic program guide (EPG). One way of using the beads is to hold a bead, say the genre bead, against electrical contacts on the console. The console may include a display and control buttons that permit the user to scroll through genre choices that may be added or subtracted from a set of currently-selected genre choices. When finished, the user can then transmit, using the console, the genre choices so-selected. The other category beads, such as time of day, may be used to make similar selections. Once completed, the complete set of preferences (a profile) with respect to each criterion may be used to filter the display of an electronic program guide by touching the user's bead to the console and actuating a control requesting that the profile be used to filter the display. The latter request may be invoked by pressing a button on the console for "Use" or "Apply."

Alternatively, the bead may merely have a unique identity which corresponds to data stored somewhere else, for example on the console or in the set-top box. The preferences may even be stored on a web-site.

5           The console may contain wireless transceivers to allow communication with other consoles and with the set-top box or other devices such as kiosk terminals in shopping malls that give custom shopping advice based on user-preferences. Using the ability of the consoles to  
10       communicate with each other, a user could share certain preferences or other data with another user, and the receiver could associate the received data with a new bead. Since each bead is unique, the user need only add another bead to his/her string and establish a download ministered  
15       by a control program on the consoles in the manner of current PDA devices.

It is contemplated that the above invention may be used in connection with many different kinds of data. For example, a bead could be associated with email, a gift  
20       registry, a list of favorite books, or a ranking of web-sites. These objects may be duplicated at will, since they only need to have their unique code associated with a unique data set. In this way, they could be automatically

updated by another person at the place where the data is stored, always giving the person accessing the data a view of only the latest data set.

The invention will be described in connection  
5 with certain preferred embodiments, with reference to the following illustrative figures so that it may be more fully understood. With reference to the figures, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of the preferred  
10 embodiments of the present invention only, and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the invention. In this regard, no attempt is made to show structural details  
15 of the invention in more detail than is necessary for a fundamental understanding of the invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice.

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#### BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 is an illustration of a base station system than can support some embodiments of the invention.

Fig. 2A is an illustration of a console and bead in communication with the console according to an embodiment of the invention.

Fig. 2B is a functional block diagram of elements of the console and a bead from Fig. 1A.

Fig. 3 is an illustration of a console and beads on a string illustrating different category beads according to an embodiment of the invention.

Fig. 4 is an illustration of two beads from separate users in communication according to an embodiment of the invention.

Fig. 5 is an illustration of a user interface supporting communication between beads from separate users according to an embodiment of the invention.

Fig. 6 is an illustration of a user interface for programming a genre bead according to an embodiment of the invention.

Fig. 7 is an illustration of a user interface for programming a channel bead according to an embodiment of the invention.

Fig. 8 is an illustration of a user interface for programming a key word bead according to an embodiment of the invention.

Fig. 9 is an illustration of a bead string in which beads have displays according to an embodiment of the invention.

Fig. 10 is an illustration of a simple mechanism for indicating when a bead is being activated by a user according to an embodiment of the invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, the invention relates to database storage, search, and retrieval using physical objects that have functional associations that make it easy and intuitive to perform certain actions. The invention may be used in connection with search and visualization tasks in connection with electronic program guides (EPGs). In the context of televisions, EPG is applied loosely to various features that can be delivered using a database of program information. The program information may include titles and various descriptive information such as a narrative summary, various keywords categorizing the content, etc. In an embodiment, a computer 240 sends program information to a television or monitor 230. The computer 240 may be equipped to receive a video signal 270 and control the channel-changing function, and to allow a

user to select channels through a tuner 245 linked to the  
computer 240 rather than through a tuner in the television.  
The user can then select the program to be viewed by  
highlighting a desired selection from the displayed program  
schedule using the remote control 210 to control the  
5 computer. The computer 240 has a data link 260 through  
which it can receive updated program schedule data. This  
could be a telephone line connectable to an Internet  
service provider or some other suitable data connection.  
10 The computer 240 has a mass storage device 235, for example  
a hard disk, to store program schedule information, program  
applications and upgrades, and other information.  
Information about the user's preferences and other data can  
be uploaded into the computer 240 via removable media such  
15 as a memory card or disk 220.

Note that many substitutions are possible in the  
above example hardware environment and all can be used in  
connection with the invention. The mass storage can be  
replaced by volatile memory or non-volatile memory. The  
20 data can be stored locally or remotely. In fact, the  
entire computer 240 could be replaced with a server  
operating offsite through a link. Rather than using a  
remote control to send commands to the computer 240 through



an infrared (IR) port 215, the controller could send commands through a data link 260 which could be separate from, or the same as, the physical channel carrying the video. The video signal 270 or other content can be carried by a cable, RF, or any other broadband physical channel or obtained from a mass storage or removable storage medium. It could be carried by a switched physical channel such as a phone line or a virtually switched channel such as ATM or other network suitable for synchronous data communication. Content could be asynchronous and tolerant of dropouts so that present-day IP networks could be used. Further, the content of the line through which programming content is received could be audio, chat conversation data, web sites, or any other kind of content for which a variety of selections are possible. The program guide data can be received through channels other than the separate data link 260. For example, program guide information can be received through the same physical channel as the video or other content. It could even be provided through removable data storage media such as memory card or disk 220. The remote control 210 can be replaced by a keyboard, voice command interface, 3D-mouse, joystick, or any other suitable input device. Selections

can be made by moving a highlighting indicator, identifying a selection symbolically (e.g., by a name or number), or making selections in batch form through a data transmission or via removable media. In the latter case, one or more  
5 selections may be stored in some form and transmitted to the computer 240, bypassing the display 170 altogether.

For example, batch data could come from a portable storage device (e.g. a personal digital assistant, memory card, or smart card). Such a device could have many preferences  
10 stored on it for use in various environments so as to customize the computer equipment to be used.

A remote control/storage device 242 communicates with the computer 240 via a wireless link such as via the IR port 215 or a radio link employing an antenna 243.

15 Referring to Figs. 2A, 2B, and 3, the remote control/storage device 242 includes a console 320 and a plurality of beads 310 and 312. The console has a transceiver 392 for communicating with the computer 240, an interface 318 for interoperating with beads 310, 312 (as  
20 discussed below), and a controller 391, preferably a programmable controller. Each bead 314 contains some means for distinguishing itself from the other beads 314. For example, there may be a chip with a unique identifier

programmed into it combined with a transponder  
(collectively shown at 394). In an embodiment, the console  
320 and beads 310, 312 are all linked by a string or chain  
370. Each bead 310/312 is uniquely identified by a code.

5 The code may be encoded as the value of a resistance  
incorporated in the bead 310, for example, encoded in a  
transponder device built into the bead 310, or formed as a  
reflective pattern in the bead surface to be scanned by the  
console. Any of a variety of different mechanisms for  
10 making the beads 310 self-identifying may be used. Note  
that the bead's uniqueness may only be with respect to the  
particular console 320. All communications between the  
beads 310 and the outside world go through the console, in  
this embodiment, so as long as each bead 310 is  
15 distinguishable from the others and the console 320 is  
unique with respect to consoles of other users (e.g., using  
a serial number stored on a "smart chip"), then each bead  
can be unique. To make it easy for users, the beads could  
be sold with a color or color pattern, picture, shape or  
20 other characteristic that makes it unique and insures it  
can be distinguished from other beads on a string.

In use, a link is generated between one of the  
beads 312 and the console 320. This link may be

established, for example, by placing the bead 312 in a recess 375. Certain features associated with the bead's 312 meaning can then be accessed based on the programming of either or both of the console 320 and/or the computer 240. When bead 312 is placed in the console 320, the console reads the unique identifier of the bead and employs any of a variety of mechanisms for generating a user interface protocol as a result.

The particular type of user interface that results depends on what the bead represents. For example, the bead might represent a shopping list. If the latter, the console may generate a current list of items and permit the user to add or delete items from it. One mode of adding an item could consist of pressing the clothing list bead 367 to the console's recess 375 while, or after, an advertisement showing the item aired in a television broadcast. So-called digital TV devices, connected to the computer 240 or incorporated within it, would provide for the automatic addition of that item to a database storing a clothing list associated with the clothing list bead 367. Another way of updating such a list might be by using a bar code scanner (not shown) built into the console 320. The

user would scan bar code symbols representing items to be added to the list, such as UPC symbols of products.

If multiple related beads 310 are pressed into the recess 375 without interacting with a user interface generated in response thereto, a cumulative user interface may be generated. For example, suppose the user wanted to update both the genre and key word criteria that are in his/her preference profile. The user may momentarily press the key bead 355 and the genre bead 363 into the recess 375. In response, the console 320 would provide the user the ability to make selections from both the genre and key word lists. Once the new selections are made, the user may press the user's own profile bead, for example a Jean bead labeled "Jean" 345, and the console may allow the user to combine the modified criteria lists with the profile associated with the Jean bead 345.

The profile beads could be used in another way. Suppose a user has two profile beads, one for a friend, say a Bill bead 350 for Bill, and one for the user, Jean bead 345. The system (on computer 240, for example) may be programmed to generate a user interface that allows parts of the friend's profile to be combined with the profile of the owner of the console, namely Jean. To invoke this

process, the Bill bead 350 might be pressed into the recess 375 followed by pressing the Jean bead 345 into the recess 375. In this way, manipulating the beads is a metaphor for a software process that is to desired to be invoked.

5 Referring to Fig. 4, in another embodiment, two consoles 324 and 322 communicate via a wireless interface. The latter may be a radio link, an RF link, an audio link, an optical link, an electrical contact link or any other suitable data communications interface. In this example  
10 one user's remote control/storage device transfers data to another user's remote control storage device. An owner, Bill, has placed his profile bead, the Bill bead 360, in the recess 375 of his console 324 and a friend Jean has placed her profile bead 365 in the recess 375 of her  
15 console 322. Once the link is established and the Bill and Jean beads 360 and 365 are in place, the user interfaces of each console may confirm a transfer of data. The user interface generated on the displays 325 may permit the users to select particular parts of the data to transfer  
20 and may permit the selection of a direction: Bill-to-Jean, Jean-to-Bill, or both.

The user interface of the console may include a display 325, scroll and mode buttons 330 or any suitable

input devices as necessary to permit the making of selections as discussed above.

Referring to Fig. 5, in an example user interface display 325 to support the transfer discussed with reference to Fig. 4, a user responds in the affirmative to a display 400 asking to confirm that a data transfer is requested. Here the screen shows "soft keys" 410, that is, illustrations of the buttons 330 with labels on them to show the respective functions for purposes of the current options, which are in this case whether to confirm that the user wants to "send" profile data to another bead. The next screen 420 permits the user to select the particular data sets. The select button may be used to mark an entry in a list as displayed. In this case, each of these data sets may correspond to a separate bead on the sender's remote control/storage device. The last screen may be displayed while any necessary communication is going on.

Referring to Figs. 6, 7, and 8, to indicate the preferences that make up a profile, items may be selected from among various lists, each corresponding to a an independent criterion. Fig. 6 shows a genre list. In it, the items drama, comedy, and soaps have been selected. The selection indicates that these genres are used to filter

any data sets to which they correspond when the control/storage device is used with a given base device such as the computer 240. The soft-keys with labels Up and Down indicate the corresponding ones of buttons 330 that may be pressed to perform the function of scrolling up and down the list respectively to move the item to a highlight bar 501. The item highlighted by the highlight bar 501 may be selected or deselected from the list by pressing the In/Out button 515. A similar display is shown in Figs. 7 and 8 corresponding to selected channels and key words, respectively. Key words may be added to the list using any suitable mechanism for user entry or selection from a list.

In an embodiment, the data sets for each bead are stored on a network server and accessed through the console 320. The console may generate a uniform resource locator (URL) when activated to do so. Using the identification of one or more beads 310 that have been associated with the action (by touching to the recess, for example), and if necessary the console's 320 own identification, the console can generate a unique URL or other kind of address. Once the address is generated, the data associated with the relevant bead or beads 310 can be accessed to be modified, used, transferred, etc. In a data transfer operation, such



as discussed with respect to Figs. 4 and 5, the data actually may flow from one server address to another server address or URL to which the respective consoles 322 and 324 point.

5 In an alternative embodiment, some or all of the data may be stored on the console or within the bead. In these cases, it is possible to conduct a transfer or modification of a data set without access to a network. Since the requirement of access to a network is less of a  
10 hindrance for a wireless device, the console 320 may be a wireless network terminal.

Referring to Fig. 9, in another embodiment, each bead 510, 550, 545, 540, 560, 565 has a display 570. Each bead may have an internal or external switch that allows  
15 the display to be changed. For example, the bead could be soft with a pressure sensitive switch inside (not shown) which, when the bead is pinched, scrolls the display. The embodiment could be used in the following fashion to create a new profile. First, a bead to be used as a profile bead,  
20 e.g., Bill's bead 550, could be contacted to the console 520 recess 575. The console may be programmed to permit the user to modify or erase the contents of the Bill bead 550 profile. Assume the user indicates a desire to erase

the profile on the Bill bead 550. The user may then take each bead in turn, select the particular item in each criterion bead by squeezing the respective criteria bead 510, 540, 560, 565 and, as each selected criterion is displayed, the criterion may be added to the Bill bead 550 profile by touching the respective criteria bead 510, 540, 560, 565 to the recess 575. For example, to add genre=comedy to the Bill bead 550, the Genre bead 560 would be pinched several times until the category "comedy" appeared in its display. Then the Genre bead 560 would be touched to the recess 575 and the comedy genre thereby added to the list. Another genre category could be added or another criteria bead 510, 540, 565 could be selected and a selection from that list made.

In another embodiment that uses beads with displays 570 and controls (not shown) and communication devices inside, data can be transferred from one bead 510, 550, 545, 540, 560, 565 to another by touching a sending bead to a receiving bead. In this case, the beads could be held together and data transferred between them by actuating the switch (not shown) on the sending bead. The console could register this by any of various means. For example, if all the beads are identified by a unique

resistance, touching two beads together could short-circuit the resistances of one or more beads one of the beads is effectively identified that way. Referring to Fig. 10, a simple resistance network with each bead housing a pair of resistances, e.g., R1 and R0, connected serially by the bead string or chain 370 can be swapped into or out of the network by an internal single-pole double-throw switch. When a switch is in the normal position, the respective resistances R1-R6 are summed in the network by an ohmmeter 630. When a contact 601-606 of one bead is connected to a contact 601-606 of another bead, the respective resistances of the beads and all those between them fall out of the resistance-sum measured by the ohmmeter 630. So, for example, if the bead with R1 is touched to the bead with R4, the network consists of only resistances R1, R5, and R6. If the resistance values are chosen such that every pairing of contacts 601-606 results in a unique resistance sum being measured at the ohmmeter 630, and the resistance R0 is chosen so that its contribution to the network can always be distinguished, then the console 520 can determine which pair of beads are touching and which has its switch closed. For example, if there are ten beads and the beads have resistances ranging in integral units from 9-18 ohms

and R0 has the value of  $\frac{1}{2}$  ohm, then the pair that is shorted can be determined from the unique resistance sum of the network and the contribution of R0 can be identified. Other mechanisms for identifying which pair of beads is contacted with another are possible. For example, the console 320 could be provided with two recesses or two beads could be held in the user's hand and respective temperature sensors in each used to actuate a transponder in each that is actuated only when the temperature of the beads is above a certain value. The essential purpose is that some physical association between the objects indicates to a control/storage device as a whole the user's intent to perform some operation with the data that corresponds to each bead.

A very straightforward and simple embodiment is one in which each bead has a transponder or transmitter that is activated in response to a switch. For example, each bead could have a transmitter that transmits only when body heat raises the beads temperature above a certain level. Then, when any of the beads are held in the hand, the data sets associated with those beads would be active. For example, say a user has beads for Jill, Michael, and Jean's preferences. The user could pick up only Michael's

bead and review EPG choices through Michael's preferences. Alternatively, Michael's and Jill's preferences could be summed by picking up both the Michael and Jill beads and holding them until both transmitters generated signals.

5           Note that although in the embodiments described above, data sets are associated with beads 310, it is possible to associate data sets with any kind of object. They could be tokens, game pieces, small toys, building blocks, etc. The important feature is that data sets are  
10 associated with objects. Note also that while in the above embodiments, a recess 375 is used to interface the console 320 and a bead 310, the interface could be established by any of a number of different devices. For example, the interfaced bead could be brought in proximity and connected  
15 via a wireless link. It could be pushed into a hole in the console or a placed in a pop-out basket of the console. The bead could be placed inside a trap in the console. Many different possibilities exist and believed to be within the scope of the invention. Note that the above  
20 comments also apply to interfacing one bead with another as in the example discussed with respect to Fig. 10.

It will be evident to those skilled in the art that the invention is not limited to the details of the

all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.